

Revision of the European species of the genus *Pygostolus* Haliday (Hymenoptera: Braconidae: Euphorinae), with a key to the Holarctic species

C. van Achterberg

Achterberg, C. van. Revision of the European species of the genus *Pygostolus* Haliday (Hymenoptera: Braconidae: Euphorinae), with a key to the Holarctic species.

Zool. Med. Leiden 66 (24), 31.xii.1992: 349-358, figs 1-25.—ISSN 0024-0672.

Key words: Hymenoptera; Braconidae; Euphorinae; Centistini; *Pygostolus*; Nearctic; Palaearctic; Holarctic; Europe; distribution; key.

Pygostolus falcatus auct. consists of two species: *Pygostolus falcatus* (Nees, 1834) and *P. otiorhynchi* (Boudier, 1834). Both species are redescribed and illustrated. A key to all described species is provided. A neotype is designated for *Leiophron falcatus* Nees, 1834.

C. van Achterberg, Nationaal Natuurhistorisch Museum, Postbus 9517, 2300 RA Leiden, The Netherlands.

Introduction

The genus *Pygostolus* Haliday, 1833 of the tribe Centistini Čapek, 1970 (Braconidae: subfamily Euphorinae Foerster, 1862) is small and contains only Holarctic species, but several undescribed Neotropical species have been collected (Shaw, 1985). The genus can be recognized at once by the felty setose and flattened mesosternum of the females (van Achterberg, 1985), and the distinctive shape of the first metasomal tergite (fig. 5). Its species mainly parasitize adults of Curculionidae (van Achterberg, 1985; Shaw, 1985; Shaw & Huddleston, 1991), but larval or pupal stages of their hosts can also be attacked successfully. In the latter case the development is delayed until the host becomes adult, avoiding the more complicated process of oviposition in adult beetles. *Pygostolus* is unique among Euphorinae because it constructs its cocoon on twigs or leaves (Shaw & Huddleston, 1991). This is different from the habit of some Meteorini which pupate in leaf-rolls of their host. *Pygostolus* species are frequently reported to have been reared from lepidopterous hosts; it needs to be investigated further, whether for species of this genus lepidopterous hosts may serve as alternative hosts.

Species of *Pygostolus* are comparatively difficult to identify, especially the males. Haeselbarth (1971) supplied a key to the three known European species which is very helpful, but it does overlook the fact that one of the species, *P. falcatus*, in fact comprises two species. Since *P. falcatus* is an aggregate, there occur four species of *Pygostolus* in Europe (and five in the Palaearctic region as a whole). One of the species involved is smaller and much darker than the more common type of *P. falcatus* auct. The type of *P. falcatus* (Nees) is lost. Fortunately, the original description by Nees (1834) clearly states that the pterostigma is darkened ("nervis et stigmate fuscis"); also the colour of the body (especially of the metasoma apically and the frons) and its size ("Long lin. 1 3/4.") indicate that this species is the original "*Leiophron falcatus*" of Nees. For the species more common in western Europe the name *Bracon otiorhynchi* Boudier, 1834, is available. All four species recognized so far in the Palaearctic region also occur in the

Nearctic region according to Shaw (1985). The genuine *P. falcatus* has been reared by Dr J.-P. Aeschlimann (Montpellier) from *Sitona humeralis* Stephens living as larvae on roots of cultivated *Medicago* spp. It has at least two generations per single generation of its host (Aeschlimann, 1980). This host has been accidentally introduced into Australia, where it has caused increasing damage to a wide range of *Medicago* spp. (Aeschlimann, 1980). The other species, *P. otiorhynchi*, has a wider range, because it occurs among (coniferous) trees and herbs. The holotype has been reared from a species on herbs and two specimens examined have been reared from a cocoon on *Picea abies* Linnaeus and from a mummy on *Pinus strobus* Linnaeus (RMNH: Netherlands, Wageningen). *Pygostolus* specimens are nocturnal (as the adult hosts are), they have been frequently collected at light and one specimen of *P. falcatus* has been collected around midnight (RMNH: Netherlands, Neercanne).

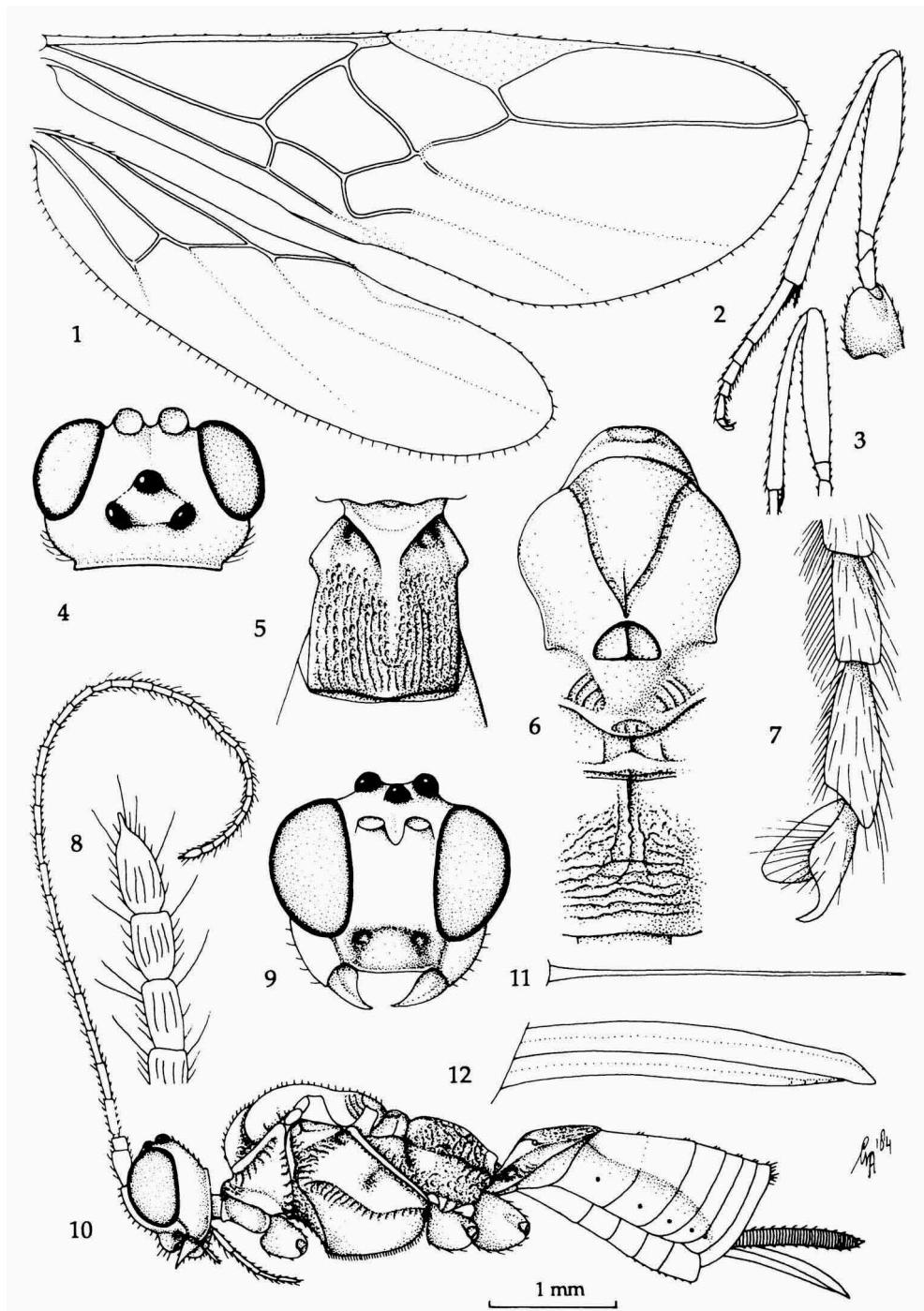
For the identification of the subfamily Euphorinae and the tribe Centistini, see van Achterberg (1990), and for a key to the genera, see van Achterberg (1985). For the terminology used in this paper, see van Achterberg (1988).

Descriptions

Pygostolus Haliday, 1833 (figs 1-25)

Pygostolus Haliday, 1833: 263; Shenefelt, 1969: 122-124; van Achterberg, 1982: 137-138 (neotype designation of type species), 1985: 353, figs 30-36 (key to genera); Shaw, 1985: 334-335; Tobias, 1986: 221-223; Shaw & Huddleston, 1991: 66. Type species (by monotypy): *Cryptus sticticus* Fabricius, 1798.

Diagnosis.—Maxillary palp with 5 segments, but basal segment obviously composed of two amalgamated segments; labial palp with 3 segments, short (fig. 10); apex of antenna with spine (fig. 8); occipital carina complete, comparatively low on head (fig. 10), joining hypostomal carina distinctly above base of mandible; occipital flange medium-sized (fig. 10); epistomal suture distinct (fig. 9); malar suture shallowly impressed (figs 9, 10); anterior subalar depression with carina (fig. 10); mandible normal basally (fig. 10), and strongly twisted apically; prepectal carina complete, medium-sized; mesosternum flattened and of female felty setose, velvet-like (fig. 10); mesopleuron long ventrally; precoxal sulcus of Holarctic species complete; metapleural flange large and obtuse, comparatively thin (fig. 10); notauli complete, its inner sides carinate (fig. 6); vein 1-SR of fore wing present, resulting in a distinctly petiolate first discal cell (fig. 1); vein 1-SR+M of fore wing present (fig. 1; may be absent in Neotropical species); vein M+CU1 of fore wing sclerotized; plical lobe of hind wing rather medium-sized (fig. 1); vein 1-M of hind wing much shorter than vein 1r-m (fig. 1); tarsal claws robust, with medium-sized apical tooth, simple (fig. 7); fore and middle tarsi normal; all tarsi of both sexes densely whitish setose ventrally, without ventral row of setae (figs 2, 7); fore femur more slender than hind femur (figs 2, 3); dorsal face of propodeum not well differentiated from posterior part and without posterior areola (figs 6, 10); first metasomal tergite robust, parallel-sided behind spiracles, its surface sculptured (fig. 5), and its length about 1.2 times its apical width; dorsope large and deep (fig. 5); laterope very deep and large (fig. 10); second metasomal tergite smooth; hypopygium of female normal, medium-



Figs 1-12, *Pygostolus sticticus* (Fabricius), ♀, neotype. 1, wings; 2, hind leg; 3, fore femur and tibia; 4, head, dorsal aspect; 5, first metasomal tergite, dorsal aspect; 6, mesosoma, dorsal aspect; 7, hind claw; 8, apex of antenna; 9, head, frontal aspect; 10, habitus, lateral aspect; 11, ovipositor, dorsal aspect; 12, ovipositor, lateral aspect. 1, 2, 3, 10: 1 x scale-line; 4-6, 9: 2 x; 7, 8: 2.5 x; 11, 12: 2.7 x.

sized, smooth and apically truncate (fig. 10); ovipositor strongly compressed, knife-like, deep (figs 10, 24), straight or rather curved, and with shallow notch, and indistinct ventral teeth; ovipositor sheath wide, densely transversely striate, rather flat, subtruncate apically and setose (figs 10, 16, 24), and its length 0.2-0.3 times fore wing.

Distribution.— Holarctic; Neotropical (at least five undescribed species: Shaw (1985); especially in C America).

Biology.— Parasites of (mainly) adult Curculionidae, less commonly of Chrysomelidae. Records of Lepidoptera as hosts need checking (Shaw & Huddleston, 1991).

Key to the Holarctic species of the genus *Pygostolus* Haliday

1. Antennal segments of both sexes 26-31; dorso-posterior part of pronotal sides largely smooth; vein SR1 of fore wing 10-13(-15) times vein r of fore wing (figs 13, 21); length of fore wing of ♀ 2.3-5.5 mm; ovipositor sheath comparatively slender (fig 16, 18); ovipositor distinctly bent (figs 16, 18) 2
- Antennal segments of both sexes 32-37; dorso-posterior part of pronotal sides distinctly sculptured (fig. 10); vein SR1 of fore wing 7-10 times vein r of fore wing (figs 1, 23); length of fore wing of ♀ (4)-5-8 mm; ovipositor sheath and shape of ovipositor variable, nearly straight (fig. 10), or curved (*P. multiarticulatus* (fig. 24) and West Palaearctic, has length of fore wing 7-8 mm; however, the Japanese *P. septentrionalis* has ovipositor similar to *P. otiorhynchi* and has length of fore wing about 4 mm) 3
2. Pterostigma of ♀ completely yellow, distinctly paler than vein 1-R1 (= metacarp); veins 1-SR and 1-M of fore wing hardly or not darker than vein 1-SR+M, yellowish; spurious part of vein R1 of hind wing largely unpigmented (fig. 19); precoxal sulcus of ♀ nearly always narrow; frons medially, mesosternum, propodeum and metasoma apically of ♀ yellowish; length of fore wing of ♀ 3.7-5.1 mm; parasite of Curculionidae: Otiorhynchinae *P. otiorhynchi* (Boudier)
- Pterostigma of ♀ infuscated, similar to vein 1-R1; veins 1-SR and 1-M of fore wing much darker than vein 1-SR+M, dark brown; spurious part of vein R1 of hind wing largely pigmented (fig. 17); precoxal sulcus of ♀ wider (cf. fig. 10); frons medially, mesosternum, propodeum and metasoma of ♀ more or less dark brown or blackish, exceptionally body largely yellowish; length of fore wing of ♀ 2.3-3.6 mm, exceptionally up to 4.5 mm; parasite of Curculionidae: Brachyderinae. *P. falcatus* (Nees)
3. Veins 1-SR, 1-M and C+SC+R of fore wing dark brown; length of fore wing about 4 mm; ovipositor comparatively slender apically (fig. 22); E Palaearctic *P. septentrionalis* Watanabe
 Note. *P. septentrionalis* Watanabe, 1937 is very similar to *P. otiorhynchi* but *otiorhynchi* has veins 1-SR, 1-M and C+SC+R of fore wing yellowish-brown, pronotal sides not (or hardly) crenulate dorsally and has less (27-30) antennal segments.
- Veins 1-SR, 1-M and C+SC+R of fore wing yellowish-brown; length of fore wing 5-8 mm; ovipositor comparatively robust apically (figs 12, 25); Holarctic 4
4. Apex of ovipositor robust (fig. 12) and ovipositor (nearly) straight (fig. 10); ovipositor sheath about as long as apical height of metasoma (fig. 10); maximum width of ovipositor sheath about equal to medial width of hind tibia (figs 2, 10); antennal segments 32-35; complete stemmaticum, propodeum and mesosternum

- (largely) of ♂ blackish *P. sticticus* (Fabricius)
- Apex of ovipositor rather slender (fig. 25) and ovipositor distinctly curved (fig. 24); ovipositor sheath somewhat longer than apical height of metasoma (fig. 24); maximum width of ovipositor sheath much less than medial width of hind tibia; antennal segments 34-37; stemmaticum usually partly, propodeum and mesosternum of ♂ largely brownish *P. multiarticulatus* (Ratzeburg)

Pygostolus otiorhynchi (Boudier, 1834)
(figs 18-21)

Bracon otiorhynchi Boudier, 1834: 334; Shenefelt, 1969: 17 (as synonym of *Blacus barynoti* (Boudier)).

Holotype, ♀ (ZSSM), from France (examined by C.J. Zwakhals).

Pygostolus otiorhynchi; Haeselbarth, 1971: 1-2 (as synonym of *P. falcatus*).

Pygostolus falcatus; Haeselbarth, 1971: 5-7.

Material.— Specimen used for redescription, ♀ (RMNH), "Switzerland, Graubünden, Vulpera, nr Scuol, 1300 m, Mal. trap, 14-26.viii.1988, C.v.Achterberg". Additional specimens (37 ♀♀ + 10 ♂♂, all RMNH unless otherwise indicated): 1 ♀, "[Switzerland], Meyer-Dür, Helvetia"; 1 ♀, "Luxembourg, Clervaux, J.A.W. Lucas", "em. 8.vi.1979, ex Coleopterous host" [Curculionid beetle belonging to *Caenopsis* spec. attached]; 1 ♀, "Nederland, Wijster (Dr.), opposite Biol. Stat., 17-27.v.1974, C.v. Achterberg"; 1 ♀, id., but "8-12.vii.1974"; 1 ♀, "[Netherlands], Bilthoven (Utr.), 24.viii.1973, Dr. C. de Jong"; 4 ♀♀, "Netherlands, Gld., Tongeren, 3.ix.1991, B. v.Aartsen"; 1 ♀, id., but "14.viii.1991"; 1 ♀, id., but "2.viii.1990"; 1 ♀, "Netherlands: L. Vilt, 10.viii.1991, B. v.Aartsen, RMNH'91"; 1 ♀, "Nederland, Putten (GLd.), 11.vi.1969, J.B. Wolschrijn"; 1 ♀, "Museum Leiden, Holland (Ov.), Lemelerberg (Gem. Ommen), 19.vi.1973, Ph. Pronk (73.002)"; 6 ♀♀, "Netherlands, Nunspeet, 14.vii.1976, C.J. Zwakhals" (1 ♀), "23.v.1976" (1 ♀), "6.viii.1976" (2 ♀♀), "31.viii.1976" (1 ♀), and "Mythstee, 27.vii.1984, R.T. Simon Thomas, RMNH'84"; 1 ♀, id., but "5.ix.1984"; 1 ♂, "Netherlands: Gld., Wageningen, ex mummy of ?Geometrid on *Pinus strobus*, viii.1990, L. Moraal, RMNH'90"; id., but "ex cocoon on *Picea abies* L., vi.1989"; 1 ♂, "Netherlands, Meyendel, nr The Hague, Bierlap, outer dunes, 11-18.vii.1974, A.P.M. v.d.Zon"; 1 ♂, "Nederland, 't Harde, 16.vi.1985, B. van Aartsen"; 1 ♀, "Museum Leiden, Nederland, Heerde (Gld.), x.1979, J.B. Wolschrijn"; 1 ♀, id., but "25.v.1982, K.J. Huisman"; 1 ♂, "Netherlands, St. Pietersberg, 24.ix.1986, C.J. Zwakhals"; 1 ♂, id., but "8-15.v.1988, c. 150 m, B. van Aartsen"; 1 ♀, id., but "17.viii.1987"; 4 ♀♀, id., but "3.x.1986" (1 ♀), "10.viii.1986" (1 ♀), and "19.ix.1987" (2 ♀♀); 1 ♀, "Nederland, Oostvoorne (Z.-H.), Biol. Station, 14-28.vii.1973, C.v.Achterberg"; 1 ♀, "Holland, Overveen, 1-4.vi.1974, C.J. Zwakhals"; 1 ♀, "Nederland, Crailo, 13.vi.1969, J.B. Wolschrijn"; 1 ♀, "Nederland", "Drijber (Dr.)", "at light, 10.vi.1974, leg. K.J. Huisman"; 1 ♀, "Holland, Schayk, 7.vi.[19]50, H. Teunissen"; 1 ♀, "[Netherlands], Six, Utrecht"; 4 ♀♀, "[Netherlands], Kemperberg, Hoge Veluwe, 25.vii.[19]49, leg. J.G. Betrem"; 1 ♂, "[Germany], Reinh[ard], Saxon[y]", 1 ♀, id., but only "47"; 1 ♂, "Hungary, 500 m, Pest County, Naszalyatje, Seica, 10.iv.1986, W.O. de Prins leg.", "e.l. 28.iv.1986, *Brachypodium sylvaticum* Huds. B.", "Host: *Elachista chrysodesmella* Z."; 1 ♂, "Museum Leiden, S Greece, Lakonia, Parnon Oros, 1700 m, 15.vii.1980, G. Christensen"; 2 ♂♂, "Bulgaria, ex coll. Zaykov, RMNH", "Bulgaria, St. gora", "Bratan, 1982.15.viii., leg. Zaykov"; 1 ♀, id., but "Kostinbrod, 20.vii.1980"; 1 ♀ (ZIL), yellowish tag [= Sweden, Östergötland, coll. Fallén], "var. β [of *Bassus testaceus*]"; 1 ♀ (ZIL), id., but without label; 1 ♀ (ZIL), blue tag [= Sweden, Skåne, Kiviks Åsperöd, coll. Fallén]; 1 ♀, "Museum Leiden, Spain, Huelva, 12.v.1981, coast dunes, 8 km West Torre la Higuera, at light, C. Gielis".

The holotype, ♀, has length of fore wing 4.5 mm, and the pterostigma pale yellow. Its condition is too bad for redescription, therefore the ♀ from Vulpera, Switzerland, is used for the redescription. The length of the body is 4.6 mm, of the fore wing 4.5 mm.

Head.— Antennal segments 29, third segment 1.2 times fourth segment, length of third, fourth, and penultimate segments 4.4, 3.6, and 1.8 times their width, respectively; length of maxillary palp equal to height of head; OOL:diameter of ocellus:POL = 3:5:10; face and clypeus smooth; clypeus strongly convex; frons and vertex smooth

and slightly convex; length of malar space 0.9 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.5 times its height; pronotal side crenulate anteriorly and ventro-posteriorly, largely smooth but somewhat crenulate dorso-posteriorly, remainder smooth; precoxal sulcus complete, shallow, narrowly crenulate, but superficial anteriorly; metapleuron superficially rugose ventrally, largely smooth dorsally; mesoscutum laterally with some rugae; notauli complete; middle lobe of mesoscutum smooth; scutellar sulcus with one carina; scutellum convex, smooth; side of scutellum densely rugose; propodeum rather densely and coarsely reticulate-rugose, with short median carina anteriorly and with median areola rather distinct.

Wings.— Fore wing: r:SR1:2-SR = 4:44:13; marginal cell comparatively short (fig. 21); 1-CU1:2-CU1 = 4:13; 1-CU1 oblique. Hind wing: spurious part of vein R1 nearly unpigmented (fig. 19).

Legs.— Hind coxa punctate largely smooth; tarsal claws normal; length of femur, tibia and basitarsus of hind leg 4.2, 10.0 and 5 times their width, respectively; hind tibial spurs both 0.3 times hind basitarsus.

Metasoma.— Length of first tergite 1.4 times its apical width, its shape as of *P. sticticus* (fig. 5), (sub)longitudinally rugose, but medially smooth; length of ovipositor sheath 0.22 times fore wing, somewhat longer than height of apex of metasoma (fig. 18), and 0.6 times width of hind tibia medially; ovipositor gradually curved, and comparatively slender (figs 18,20).

Colour.— Brownish-yellow; stemmaticum, antenna (except scapus and pedicellus), and ovipositor sheath dark brown; pterostigma pale yellow, much paler than vein 1-R1; remainder of veins yellowish-brown; wing membrane subhyaline. The male is distinctly paler than of *P. falcatus*.

Variation.— Length of fore wing 3.7-5.1 (♀) or 3.1-3.6 (♂) mm, of body 3.2-4.8 (♀) or 2.6-3.2 mm (♂); antennal segments of ♀ 28(10), 29(21), 30(8), and 31(1), of ♂ 27(1), 28(3) and 29(5); length of ovipositor sheath 0.20-0.23 times fore wing; vein m-cu of fore wing interstitial to distinctly antefurcal; usually nearly completely yellowish, but mesosternum, propodeum, and first tergite (largely) may be dark brown, exceptionally the apex of the metasoma may be darkened, in general males tend to be darker than females; precoxal sulcus of ♂ wide to rather narrow.

Biology.— The holotype has been reared from *Otiorhynchus (O.) ligneus* (Olivier, 1808), a species on herbs, but obviously *P. otiorhynchi* parasitizes also hosts on trees.

Pygostolus falcatus (Nees, 1834) (figs 13-17)

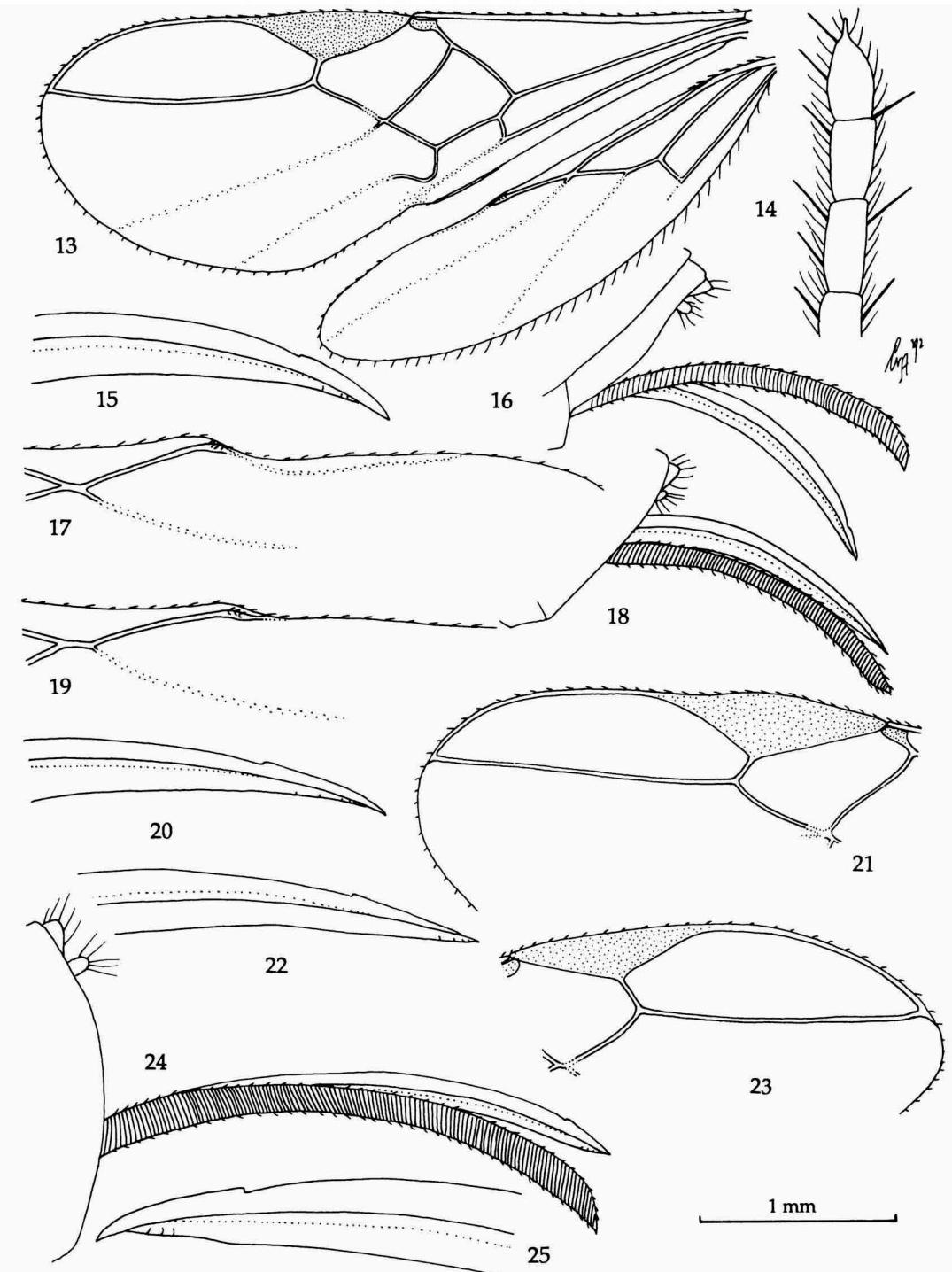
Leiophron falcatus Nees, 1834: 44. Holotype, ♀, from Germany (Sickershausen, near Göttingen) is lost.

Neotype, ♀ (RMNH) is designated below.

Pygostolus falcatus; Shenefelt, 1969: 122-123; Aeschlimann, 1980: 145; Tobias, 1986: 222.

Bassus testaceus; Fallén, 1813: 18, nec Fabricius, 1798 [examined; = *Rogas luteus* Nees, 1834], nec Gmelin, 1790. Misidentification.

Material.— Neotype (here designated), ♀ (RMNH), "Netherlands, St. Pietersberg, c. 175 m, 3.vii.1990, B. van Aartsen, RMNH'90"; 1 ♀ (RMNH), topotypic, 20.v.1989, C.J. Zwakhals; 2 ♀♀ (RMNH), "France, ♀, *P. falcatus*, AE leg, [= J.-P. Aeschlimann]", "ex *S. humeralis* (26), 29.vi.[19]80"; 1 ♂ (RMNH), "Museum Leiden, Nederland, Heerde (Gld.), 5-15.v.1980, J.B. Wolschrijn"; 1 ♀ (RMNH), "[Netherlands], Stein, J. v.d. Gein, 4.vii.1946"; 1 ♀ (RMNH), "Museum Leiden, Netherlands, Ried (Friesl.), 16.viii.1980, C. Gielis"; 1 ♀ (RMNH), id., "but 1-15.vii.1981, at light"; 1 ♀ (RMNH), "[Netherlands], Museum Leiden, Exc. St. Pietersberg, terrein Kasteel Neercanne, 21.viii.1950, op licht, 23.30-0.30 u"; 15 ♀♀ (RMNH), "Bulgaria, ex coll. Zaykov, RMNH'91", "14.v.1977, Rodopi, Batshkovo, leg. A. Zaykov", "po *Medicago sativa*"; 1 ♀ (RMNH), id., but "Galabov, 14.vi.1978"; 1 ♀ (RMNH), id., but "Chrabino, 6.v.1978"; 1 ♀



Figs 13-17, *Pygostolus falcatus* (Nees), ♀, neotype; figs 18-21, *P. otiorhynchi* (Boudier), ♀, Netherlands, 18, 20, 21: Tongeren, and 19: Wijster; figs 22, 23, *P. septentrionalis* Watanabe, ♀, Japan, Baba spa; figs 24, 25, *P. multiarticulatus* (Ratzeburg), ♀, Netherlands, Heerde. 13, wings; 14, apex of antenna; 15, 20, 22, 25, apex of ovipositor, lateral aspect; 16, 18, 24, ovipositor and its sheath, lateral aspect; 17, 19, detail of spurious vein of hind wing; 21, 23, detail of marginal cell of fore wing. 13, 21, 23: 1 x scale-line; 14, 15, 20, 22, 25: 5 x scale-line; 16-19, 24: 2 x.

(RMNH), id., but "13.v.1977"; 1 ♀ (RMNH), id., but "Kostinbrod, 29.v.1980"; 1 ♀ (ZIL), yellowish tag [= Sweden, Östergötland, coll. Fallén], "B[assus] testaceus ♀" (probably in Fallén's handwriting).

Neotype, ♀, length of body 3.2 mm, of fore wing 3.6 mm.

Head.— Antennal segments 30, third segment as long as fourth segment, length of third, fourth, and penultimate segments 3.2, 3.5, and 1.7 times their width, respectively; length of maxillary palp 0.8 times height of head; OOL:diameter of ocellus: POL = 4:5:11; face and clypeus smooth; clypeus strongly convex; frons and vertex smooth and slightly convex; length of malar space 0.8 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.7 times its height; pronotal side crenulate anteriorly and ventro-posteriorly, largely smooth and somewhat crenulate dorso-posteriorly, and remainder punctulate; precoxal sulcus complete, shallow, moderately widely crenulate, but sparsely so anteriorly; metapleuron finely rugose; mesoscutum laterally with some rugae; notauli complete; middle lobe of mesoscutum punctulate; scutellar sulcus with 3 carinae; scutellum convex, punctulate; side of scutellum with some rugae; propodeum densely and finely rugose, with short median carina anteriorly and median areola obsolescent.

Wings.— Fore wing: r:SR1:2-SR = 4:48:14; marginal cell comparatively short (fig. 13); 1-CU1:2-CU1 = 4:13; 1-CU1 oblique. Hind wing: spurious part of vein R1 weakly pigmented (fig. 17).

Legs.— Hind coxa punctate dorso-laterally, remainder largely smooth; tarsal claws normal; length of femur, tibia and basitarsus of hind leg 4.8, 8.8 and 5 times their width, respectively; hind tibial spurs both 0.35 times hind basitarsus.

Metasoma.— Length of first tergite 1.4 times its apical width, its shape as of *P. sticticus* (fig. 5), (sub)longitudinally rugose; length of ovipositor sheath 0.25 times fore wing, somewhat longer than height of apex of metasoma (fig. 16), and 0.6 times width of hind tibia medially; ovipositor gradually curved, and comparatively slender (figs 15, 16).

Colour.— Yellowish-brown; frons medially, stemmaticum, occiput and temples dorsally, mesosternum largely, propodeum, metapleuron dorsally, and ovipositor sheath blackish; antenna (except scapus), mesoscutal lobes medially, basal 0.8 of first tergite, apex of third tergite, and following tergites, and apical half of metasoma ventrally, infuscated; pterostigma rather dark brown; vein C+SC+R, 1-M, 1-SR, 1-CU1, and apex of M+CU1 of fore wing dark brown; remaining veins brown; wing membrane subhyaline. The male is distinctly paler than that of *P. falcatus*.

Variation.— Length of fore wing 2.3-3.6 (♀), one ♂ upto 4.5 mm, of body 2.1-3.2 mm (♀); antennal segments of ♀ 26(1), 28(12), 29(13), and 30(2); length of ovipositor sheath 0.24-0.26 times fore wing; first tergite may be completely yellowish; melanistic specimens occur: body dark brown with pronotum, legs and pedicellus yellowish.

Biology.— Parasites of adult Curculionidae (Brachyderinae) on herbs (e.g. *Sitona humeralis* Stephens on *Medicago* species).

***Pygostolus multiarticulatus* (Ratzeburg, 1852)**

(figs 24, 25)

Blacus multiarticulatus Ratzeburg, 1852: 64. Syntypes from Germany are probably lost.
Pygostolus multiarticulatus; Shenefelt, 1969: 123; Haeselbarth, 1971: 5-7; Tobias, 1986: 222.

Rarely collected; the syntypes were reared from cocoons on coniferous trees. At the moment the selection of a neotype is unnecessary because Ratzeburg clearly stated that the number of antennal segments of the female syntype is 35 and that the ovipositor is comparatively long (nearly as long as metasoma) and strongly curved. In The Netherlands mainly known from the Veluwe ('t Harde; Heerde), but also from the Naardermeer; additionally I have seen a male from Italy (Friuli, Barcis, leg. T. Prescudin; RMNH), which is a new record for the country.

Pygostolus septentrionalis Watanabe, 1937
(figs 22, 23)

Pygostolus septentrionalis Watanabe, 1937: 136; Shenefelt, 1969: 123.

Few specimens from Japan are known; in addition to the type series from Hokkaido (Sapporo) I have seen one female from Fukushima Pref., Honshu (RMNH: Baba spa, 7.viii.1981, A. Takasu). The biology is unknown.

Pygostolus sticticus (Fabricius, 1798)
(figs 1-12)

Ichneumon sticticus Fabricius, 1798: 229. Type from N Germany is lost; neotype, ♀ (RMNH), has been designated by van Achterberg, 1982: 137-138.

Pygostolus sticticus; Shenefelt, 1969: 124; Haeselbarth, 1971: 5-7; van Achterberg, 1982: 137-138; Tobias, 1986: 223.

Bracon barynoti Boudier, 1834: 333; Haeselbarth, 1971: 2. Type from France is lost; possible synonym, based on biological grounds (host record).

Blacus barynoti; Shenefelt, 1969: 17.

Blacus gigas Wesmael, 1835: 99; Shenefelt, 1969: 124; Haeselbarth, 1971: 5-7 (examination of holotype, synonymy confirmed). Synonymized by Ruthe, 1861.

Ichneumon sticticator Thunberg, 1822: 260; Shenefelt, 1969: 124. Type from ?Sweden is lost (Roman, 1912: 280). Synonymized by Thunberg, 1824.

Specimens examined from The Netherlands (Tongeren; 't Harde; Lexmond; Rijen; Middelharnis; Plasmolen; Geulhem; Vierhouten; Nunspeet; Heerde; Drijber), Norway (E of Bergen, 60°21' 5°27'E), Ireland (Co. Kerry, Kenmare), Belgium (Les Quatre Chemins), Slovenia (Ucka), and Sweden (Dalarna, Boda Kyrkby, Silverberg, Klysna- "Norrberga"). These are new records for Belgium, Norway and Slovenia.

Note.—*Bassus testaceus* sensu Fallén, 1813, was synonymized with *P. sticticus* by Ruthe (1861), but it is a misinterpretation of *Ichneumon testaceus* Fabricius, 1798 nec Gmelin, 1790. Fallén (1813) referred to this species as "*Basso testaceo* Fabricius", therefore it is incorrect to attribute this species to Fallén.

Acknowledgements and abbreviations

I wish to thank Mr B. van Aartsen ('t Harde), Dr R. Danielsson (Lund), Br Virgilius Lefever (Maastricht), Mr L. Moraal (Wageningen), Mr. W.O. de Prins (Antwerpen), Dr. R.T. Simon Thomas (Nunspeet), Mrs A. Takasu (Tokyo), Dr A. Zaykov (Plovdiv) and Mr C.J. Zwakhals (Arkel) for supplying many interesting Braconidae, Dr D.L.J. Quicke (Sheffield) for comments on the first draft, and C.J. Zwakhals for his help with the examination of the holotype of *Bracon otiorhynchi*. Dr R. Danielsson is

acknowledged for the excellent cooperation to solve the *Bassus testaceus*-problem. RMNH stands for Nationaal Natuurhistorisch Museum, Leiden, ZSSM for Zoologische Staatssammlung, München, ZIL for Zoological Institute, Lund.

References

- Achterberg, C. van, 1982. Notes on some type-species described by Fabricius of the subfamilies Braconinae, Rogadinae, Microgastrinae and Agathidinae (Hymenoptera, Braconidae).— Ent. Ber., Amst. 42: 133-139, figs 1-9.
- Achterberg, C. van, 1985. The genera and subgenera of Centistini, with description of two new taxa from the Nearctic Region (Hymenoptera: Braconidae: Euphorinae).— Zool. Med. Leiden 59: 348-362, figs 1-9.
- Achterberg, C. van, 1988. Revision of the subfamily Blacinae Foerster (Hymenoptera, Braconidae).— Zool. Verh. Leiden 249: 1-324, figs 1-1250.
- Achterberg, C. van, 1990. Illustrated key to the subfamilies of the Holarctic Braconidae (Hymenoptera: Ichneumonoidea).— Zool. Med. Leiden 64: 1-20, figs 1-26.
- Aeschlimann, J.-P., 1980. The *Sitona* (Col.: Curculionidae) species occurring on *Medicago* and their natural enemies in the Mediterranean region.— Entomophaga 25: 139-153, figs 1-4, tables 1-8.
- Boudier, H.P., 1834. Observations sur divers parasites.— Annls Soc. ent. Fr. 3: 327-336.
- Fabricius, J.C., 1798. Supplementum Entomologiae Systematicae: 1-572.— Hafniae.
- Fallén, C.F., 1813. Specimen novam Hymenoptera disponendi methodum exhibens (thesis): 1-42, 1 pl.— Lundae.
- Haeselbarth, E., 1971. Notizen zur Gattung *Pygostolus* Haliday (Hymenoptera, Braconidae).— Opusc. zool., Münch. 112: 1-8, figs 1-4.
- Haliday, A.H., 1933. An essay on the classification of the parasitic Hymenoptera of Britain, which correspond with the Ichneumones minuti of Linnaeus.— Ent. Mag. 1: 259-276.
- Nees von Esenbeck, C.G., 1834. Hymenopterorum Ichneumonibus affinum monographiae, genera Europaea et species illustrantes 1: 1-320.— Stuttgartiae & Tubingae.
- Ratzeburg, J.T.C., 1852. Die Ichneumonen der Forstinsecten in forstlicher und entomologischer Beziehung 3: 1-272.— Berlin.
- Roman, A., 1912. Die Ichneumonidentypen C.P. Thunbergs.— Zool. Bidr. Uppsala 1: 229-293.
- Ruthe, J.F., 1861. Deutsche Braconiden. Zweites Stück. (*Blacus*, *Pygostolus*).— Berl. ent. Z. 5: 132-162.
- Shaw, M.R. & T. Huddleston, 1991. Classification and biology of braconid wasps (Hymenoptera: Braconidae).— Handbk Ident. Br. Ins. 7(1): 1-126, figs 1-126.
- Shaw, S.R., 1985. A phylogenetic study of the subfamilies Meteorinae and Euphorinae (Hymenoptera: Braconidae).— Entomography 3: 277-370, figs 1-370.
- Shenefelt, R.D., 1969. Braconidae, 1.— Hym. Cat. (nov. ed.) 4: 1-176.
- Thunberg, C.P., 1822. Ichneumonidea, insecta Hymenoptera, illustata.— Mem. Akad. St. Petersburg 8: 249-281.
- Thunberg, C.P., 1824. Ichneumonidea, insecta Hymenoptera, illustata. Pars 2.— Mem. Akad. St. Petersburg 9: 285-368.
- Tobias, V.I., 1986. Euphorinae: p. 181-250. In: Medvedev, G.S. (ed.). Opredelitel nasekomykh Evropeiskoi tchasti SSSR 3, Pereponchatokrylye 4.— Opr. Faune SSSR 145: 1-501, figs 1-263.
- Watanabe, C., 1937. A contribution to the knowledge of the braconid fauna of the Empire of Japan.— J. Fac. Agr. Hokkaido Univ. 42: 1-188.

Received: 11.ix.1992

Accepted: 21.ix.1992

Edited: R. de Jong